Mid Exam Summer

Course Name: Operation Research

Submitted By:

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BS (SE-8) Section: A

Submitted To:

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IQRA NATIONAL UNIVERSITY

Department of Computer Science

Mid Exam Summer 2020

Subject: Operation Research — Time: 3 hours

BS (SE) BS (CS) — Instructor: Saifullah Jan

Max Marks: 30

Q 1: Use the "SIMPLEX" method to maximize the given problem.

Maximize: p = 2x + 5y

Subject to:

2x + y <= 5

x + 2y <= 4

x >= 0, y >= 0 [10 marks]

Question # 01:-

Use Simplex method

$$P = 2x + 5y$$

subject to:

$$2x + y \leq 5$$
$$x + 2y \leq 4$$
$$x, y = 0$$

- Step 1:- Slack variable

$$2x + y + s = 5$$
$$x + 2y + t = 4$$

- Step 2:-

$$P = 2x + 5y$$
$$-2x - 5y + P = 0$$

- Step 3 & Step 4:

	x	y	s	t	P	
s	2	1	1	0	0	5
t	1	2	0	1	0	4
P	-2	-5	0	0	1	0

- Step 5 & Step 6:

	x	y	s	t	P	
s	2	1	1	0	0	5
t	1	2	0	1	0	4
P	-2	-5	0	0	1	0

- Step 7:

	x	y	s	t	P	
s	2	(1)	1	0	0	5
t	1/2	1	0	1/2	0	2
P	-2	(-5)	0	0	1	0

- $R_1 = R_1 - R_3$

	x	y	s	t	P	
s	3/2	0	1	-1/2	0	3
t	1/2	1	0	1/2	0	2
P	-2	-5	0	0	1	0

- $R_3 = R_3 + 5R_2$

	x	y	s	t	P	
s	3/2	0	1	-1/2	0	3
t	1/2	1	0	1/2	0	2
P	1/2	0	0	5/2	1	10

- Step 8:
  No value is negative on the left side.

- Step 9:

$$s = 3$$
$$P = 10$$
$$t = 2$$
$$y = 0$$

Answer

Q: 2 Write the characteristics of operations research in your own words. Copying from notes/internet/book will be plagiarized and will lead to 0 marks.

[10 marks]

Systems orientation Of OR

The systems approach to issues acknowledges that the behavior of any a part of a system has some impact on the behavior of the system as an entire. Even if the individual parts are performing well, however, the system as a full isn't essentially performing equally well. As an example, assembling the simplest of each sort of automobile half, in spite of build, doesn't essentially lead to a decent automobile or maybe one that may run, because the components might not match along. It's the interaction between components, and not the actions of any single half, that determines how well a system performs.

Thus, operations research makes an attempt to evaluate the impact of changes in any {part of a part of} a system on the performance of the system as a full and to look for causes of a problem that arises in one part of a system in different components or within the interrelationships between components.

The interdisciplinary team Approach

Scientific and technological disciplines have proliferated speedily within the last a hundred years. The proliferation, ensuing from the big increase in scientific knowledge, has provided science with a file system that allows a scientific classification of knowledge. This system is useful in determination several issues by identifying the correct discipline to charm to for an answer. Difficulties arise once a lot of complicated issues, like those arising in giant organized systems, are encountered. It's then necessary to seek out transferal of conveyance along numerous disciplinary points of view. Moreover, since ways dissent among disciplines, the utilization of interdisciplinary groups makes accessible a far larger arsenal of research techniques and tools than would rather be available. Hence, {operations analysis research} is also characterized by rather uncommon combos of disciplines on analysis groups and by the use of various research procedures.

Methodological Approach

Until the twentieth century, laboratory experiments were the principal and nearly the only technique of conducting research project. But massive systems like are studied in research can't be brought into laboratories. Moreover, even though systems may be brought into the laboratory, what would be learned wouldn't essentially apply to their behavior in their natural surroundings, as shown by early

expertise with radar. Experiments on systems and subsystems conducted in their natural surroundings (“operational experiments”) are Acceptable as a results of the experimental strategies developed by British statistician R.A. Fisher in 1923–24. For sensible or maybe moral reasons, however, it's rarely attainable to experiment on massive organized systems as an entire in their natural environments. This leads to a clear dilemma: to achieve understanding of complicated systems experimentation looks to be necessary, but it cannot typically be allotted. This problem is solved by the use of models, representations of the system below study. Provided the model is nice, experiments (called “simulations”) will be conducted on it, or different strategies will be used to get helpful results.

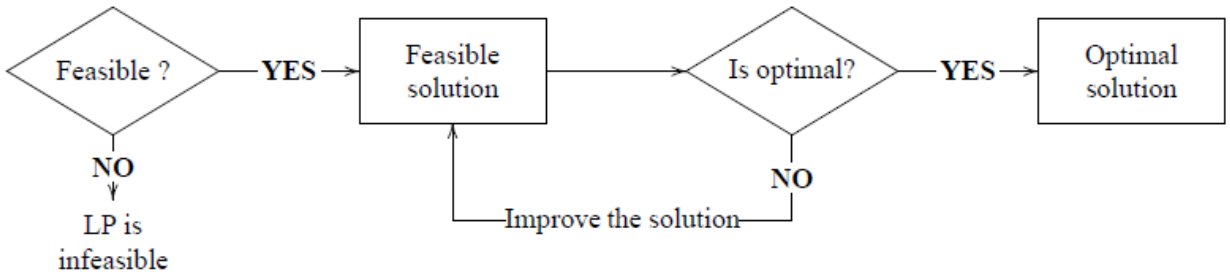
Uncovering of new issues:

The fourth characteristic of operation research, that is commonly unnoted, is that solution of an OR problem may uncover a number of latest problems. Of course, of these uncovered issues needn't be solved at a similar time. However, so as to derive most profit, each of them should be solved. It should be remembered that OR isn't effectively used if it's restricted to one-shot issues only. In order to derive full advantages, continuity of analysis should be maintained. Of course, the results of OR study concerning a specific downside needn't wait until all the connected issues solved

Improvement in quality of decisions:

Improvement in quality of selections OR provides dangerous answers to problems, to which, otherwise, worse answers are given. It implies that by applying its scientific approach, it can only improve the standard of answer but it should not be able to give good answer.

Q 3: Explain the given flow chart in your own words.



[10 Marks]

Q3

Answer:

1st step:

In first step there is a condition for checking feasibility. The system will check whether the system is feasible or not. If the solution is not feasible. Show Linear Program is infeasible. If the solution is correct. Advance to next statement.

2nd step:

After confirming that the solution is feasible the solution will be forwarded to next step.

3rd step:

Optimal solution after getting the feasible solution, check the solution whether it is optimal or not. If it is not an optimal solution, the system will return the solution back to the second module where the system will improve the solution and send it to the 3rd module to recheck the solution. If the solution is improved the system will forward the solution to the final step.

4th step:

In this last step the system will confirm that the solution is optimal.